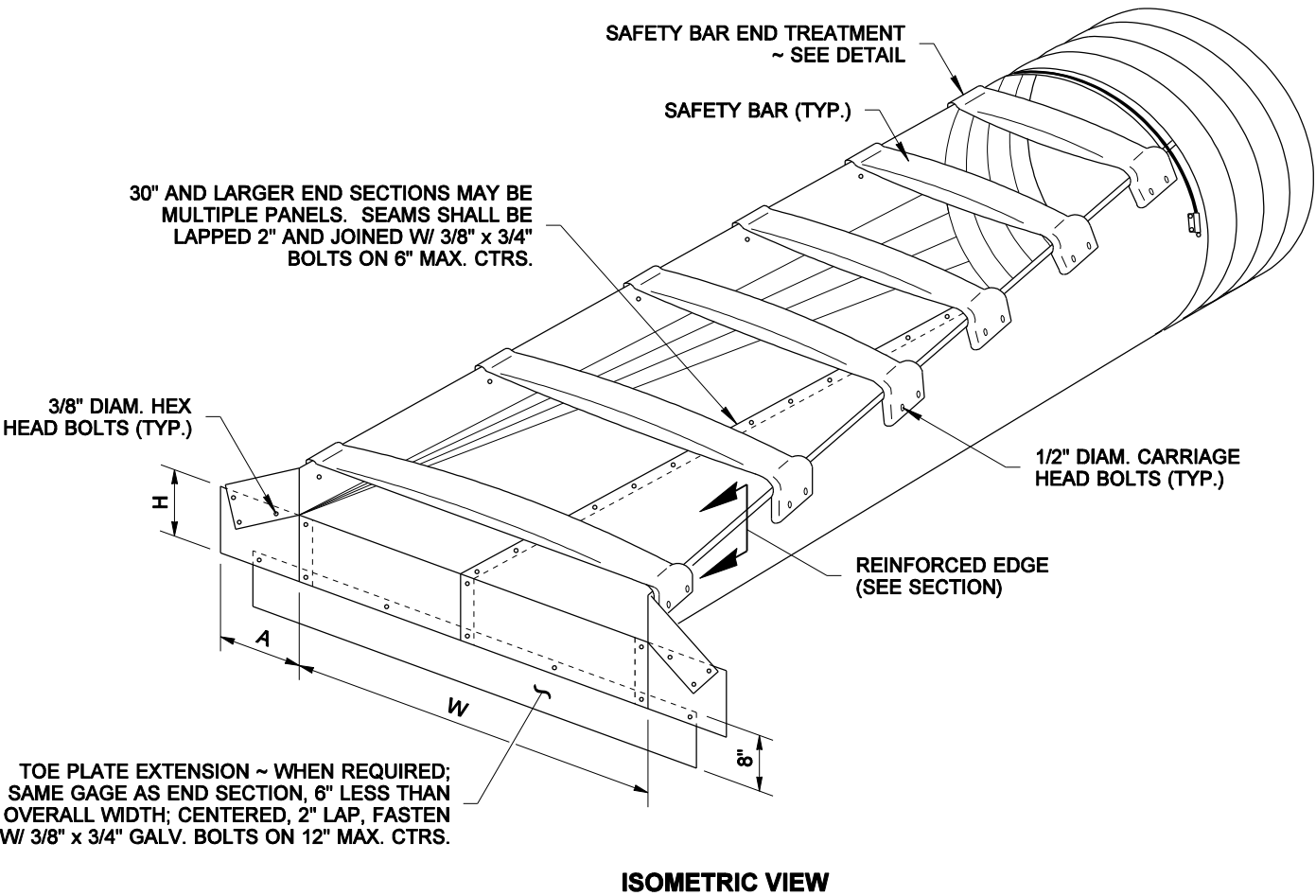
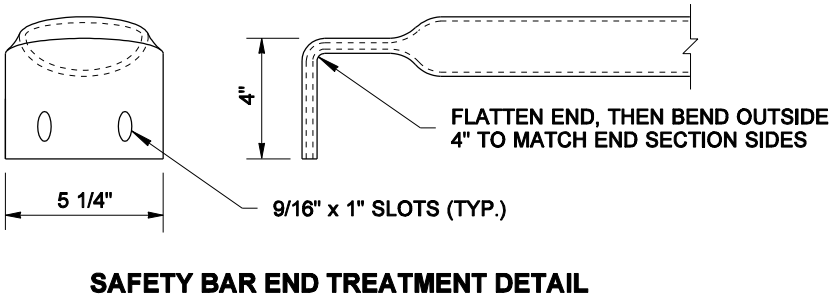
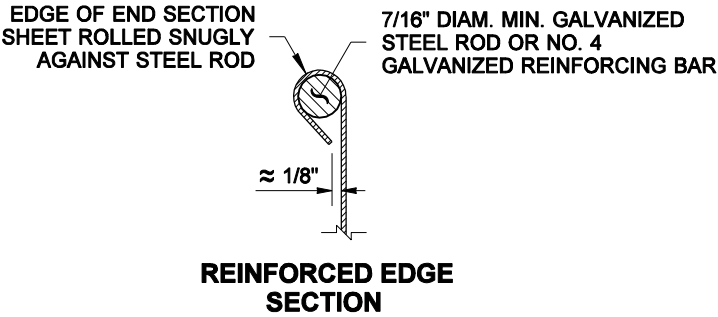
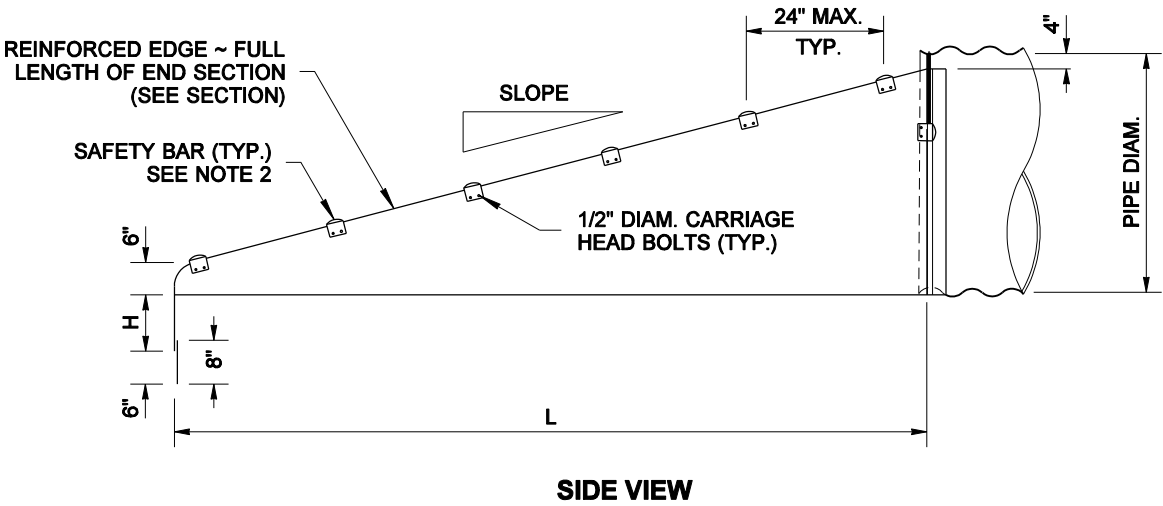


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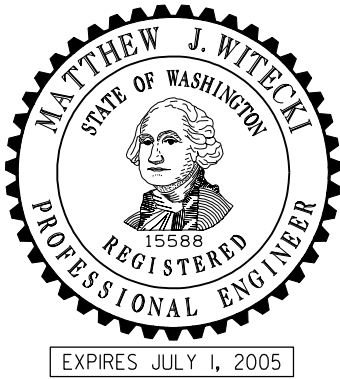
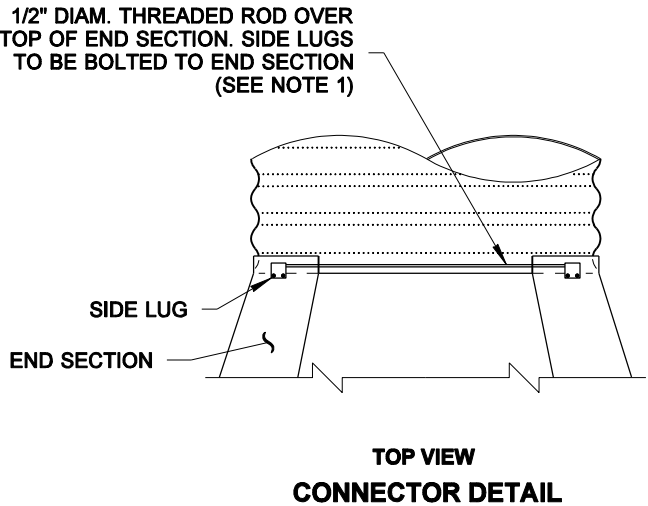
**CROSS ROAD DRAINAGE STRUCTURE**

**NOTES**

1. As an alternative connection on 15" through 24" pipe, a 1" wide strap of 16 gage or 12 gage galvanized steel, fastened with a 1/2" diam., 6" long galvanized bolt and square head nut, may be used.
2. Number of safety bars required will vary depending upon the length of the end section.

| METAL END SECTIONS FOR CIRCULAR PIPES |                   |      |                     |    |    |               |             |             |
|---------------------------------------|-------------------|------|---------------------|----|----|---------------|-------------|-------------|
| PIPE DIAM. (INCHES)                   | MINIMUM THICKNESS |      | DIMENSIONS (INCHES) |    |    |               |             |             |
|                                       | INCHES            | GAGE | A                   | H  | W  | OVERALL WIDTH | L SLOPE 4:1 | L SLOPE 6:1 |
| 15                                    | .064              | 16   | 8                   | 6  | 21 | 37            | 20          | 30          |
| 18                                    | .064              | 16   | 8                   | 6  | 24 | 40            | 32          | 48          |
| 21                                    | .064              | 16   | 8                   | 6  | 27 | 43            | 44          | 66          |
| 24                                    | .064              | 16   | 8                   | 6  | 30 | 46            | 56          | 84          |
| 30                                    | .109              | 12   | 12                  | 9  | 36 | 60            | 80          | 120         |
| 36                                    | .109              | 12   | 12                  | 9  | 42 | 66            | 104         | 156         |
| 42                                    | .109              | 12   | 16                  | 12 | 48 | 80            | 128         | 192         |
| 48                                    | .109              | 12   | 16                  | 12 | 54 | 86            | 152         | 228         |
| 54                                    | .109              | 12   | 16                  | 12 | 60 | 92            | 176         | 264         |
| 60                                    | .109              | 12   | 16                  | 12 | 66 | 98            | 200         | 300         |

| METAL END SECTIONS FOR ARCHED PIPES |                      |            |                   |      |                     |    |    |               |             |             |
|-------------------------------------|----------------------|------------|-------------------|------|---------------------|----|----|---------------|-------------|-------------|
| EQUIV. DIAM. (INCHES)               | PIPE ARCH DIMENSIONS |            | MINIMUM THICKNESS |      | DIMENSIONS (INCHES) |    |    |               |             |             |
|                                     | SPAN (IN.)           | RISE (IN.) | INCHES            | GAGE | A                   | H  | W  | OVERALL WIDTH | L SLOPE 4:1 | L SLOPE 6:1 |
| 18                                  | 21                   | 15         | .064              | 16   | 8                   | 6  | 27 | 43            | 20          | 30          |
| 21                                  | 24                   | 18         | .064              | 16   | 8                   | 6  | 30 | 46            | 32          | 48          |
| 24                                  | 28                   | 20         | .064              | 16   | 8                   | 6  | 34 | 50            | 40          | 60          |
| 30                                  | 35                   | 24         | .079              | 14   | 12                  | 9  | 41 | 65            | 56          | 84          |
| 36                                  | 42                   | 29         | .109              | 12   | 12                  | 9  | 48 | 72            | 76          | 114         |
| 42                                  | 49                   | 33         | .109              | 12   | 16                  | 12 | 55 | 87            | 92          | 138         |
| 48                                  | 57                   | 38         | .109              | 12   | 16                  | 12 | 63 | 95            | 112         | 168         |
| 54                                  | 64                   | 43         | .109              | 12   | 16                  | 12 | 70 | 102           | 132         | 198         |
| 60                                  | 71                   | 47         | .109              | 12   | 16                  | 12 | 77 | 109           | 148         | 222         |
| 72                                  | 83                   | 57         | .109              | 12   | 16                  | 12 | 89 | 121           | 188         | 282         |



**TAPERED END SECTION WITH TYPE 4 SAFETY BARS (ON CROSS ROAD) STANDARD PLAN B-9d**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

**Harold J. Peterfeso** 11-23-04

STATE DESIGN ENGINEER

DATE



Washington State Department of Transportation

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